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STANDARD CHLORINE OF DELAWARE, INC.

PHASE 1A CULTURAL RESOURCES ASSESSMENT FINAL REPORT

(PURCHASE ORDER NO. 03035230-01)

JANUARY 1993

DAMES & MOORE

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1.0 Management Summary

Dames & Moore conducted a Phase I(A) cultural resource evaluation of a site of approximately twenty-five acres for Standard Chlorine of Delaware, Inc. (SCD) in Delaware City, Delaware. To perform the evaluation, Dames & Moore (1) carried out a comprehensive document search to identify any known or potential historical, architectural, and/or archeological resources within the study area; and (2) conducted a walkover survey with limited shovel and trowel testing of the site in order to locate visible cultural features, artifacts, and/or standing structures, to isolate areas that are severely disturbed, and to identify areas with a high probability of containing significant cultural resources.

The project area is situated immediately to the north of the SCD plant site. It is about evenly divided between relatively flat terrain and moderate slopes overlooking Red Lion Creek to the north and an unnamed tributary of Red Lion Creek to the west. The level topography of portions of the project area and its location above the creek make it a candidate for past occupation. Flat terrain is covered by recent (less than 10-15 years old) secondary growth of shrubs and brush, whereas the slopes (where not cleared during the 1986 paradichlorobenzene cleanup) are mantled by mature forest. A number of graveled roads are maintained throughout the flat areas to provide access to groundwater monitoring wells.

Inspection of records at the Delaware Division of Historical and Cultural Affairs revealed that the only site on record in the project area is a report by Delaware State Archeologist Faye Stocum of finding flakes and fire-cracked rock upslope from Soil Piles A and B (7NC-E-106) during a prior visit to the area. However, there are several historic and prehistoric sites registered in the Division records for the surrounding Red Lion Creek region which illustrate the suitability and attractiveness of the study area for past human occupation.

On November 5th and 6th, 1992, Dr. Christopher L. Nagle and Nathan Knoche of Dames & Moore conducted a walkover and visual inspection of the project area. Most of the level areas of the project area were found to have been badly disturbed in the past, much of which probably took place as a result of the 1986 cleanup. No cultural features or evidence of past structures were located. Only one artifact was found, lying on the surface of the ground upslope from Soil Pile A. It is a small sherd of historic pottery, tentatively identified as redware dating to ca. A.D. 1751-1818. The flakes and fire-cracked rock reported by Faye Stocum were not relocated by us, nor were additional similar materials found during our visit.

Two small areas on the level portions of the project site were identified which may remain undisturbed: (1) an area of about 100-200x50 feet at the crest of the slope above Soil Pile B, where standing mature trees suggest a lack of ground disturbance; and (2) the far northern edge of the level portion of the project area, farthest from the plant, by virtue of its distance from the plant and the loci of the 1986 cleanup operations.

Dames & Moore recommends that these two possibly undisturbed areas be avoided during future remediation efforts at the project site or, if avoidance is not feasible or practical, that further archeological work be conducted on them to rule out the presence of cultural resources there.

2.0 Introduction

Dames & Moore was contracted by Standard Chlorine of Delaware, Inc. (SCD) of Delaware City, Delaware to perform a Phase I(A) cultural resource evaluation of a site of about twenty-five acres located north of SCD's plant site (Figure 1). The objective of the evaluation was to assess the project area for the presence or absence of potentially significant archeological or historical materials in conjunction with SCD's ongoing Remedial Investigation/Feasibility Study (RI/FS). The need to perform a cultural resource assessment of the project site is related to the Superfund investigation of the area.

3.0 Project Area Setting

The project area is situated immediately to the north of the SCD plant site (Figure 2). It consists of approximately twenty-five acres of land, about evenly divided between relatively flat terrain and moderate slopes overlooking Red Lion Creek to the north and an unnamed tributary of Red Lion Creek to the west. Flat terrain is covered by recent (less than 10-15 years old) secondary growth of shrubs and brush, whereas the slopes (except where cleared during the 1986 paradichlorobenzene cleanup) are mantled by mature forest. Two piles of contaminated soil, each roughly 30 to 50 meters long by 15 meters wide, are positioned on the upper portion of the west-facing slope above the unnamed tributary. These are referred to as Soil Piles A and B. The sedimentation basin lies on flat ground on the southern boundary of the project area, just outside the SCD plant fence. A number of graveled roads are maintained throughout the level areas on top of the hill to provide access to groundwater monitoring wells. The level topography of portions of the project area and its location above Red Lion Creek make it a candidate for past human occupation.

4.0 Research Design

Dames & Moore performed a comprehensive document search to identify any known or potential historical, architectural, and/or archeological resources within the study area. This task included checking current site files at the Delaware State Historic Preservation Office for recorded sites in the project area and consulting historic maps to locate known sites. Information on any known or projected resources was recorded. The staff of the Delaware Division of Historical and Cultural Affairs was consulted about the probability of sites in the project area. This task also included an evaluation of the differential sensitivity of the area for the presence of cultural resources. Evaluation is based on data such as topography, distance to water source and other determinants of prehistoric and historic occupation.

Field work for the project included a one-time site inspection, entailing a walkover survey in parallel transects. The purpose of this walkover was to visually inspect the property to locate visible archeological features, artifacts, and standing structures, to identify areas that are severely disturbed, and to locate areas with a high probability of containing significant cultural resources.

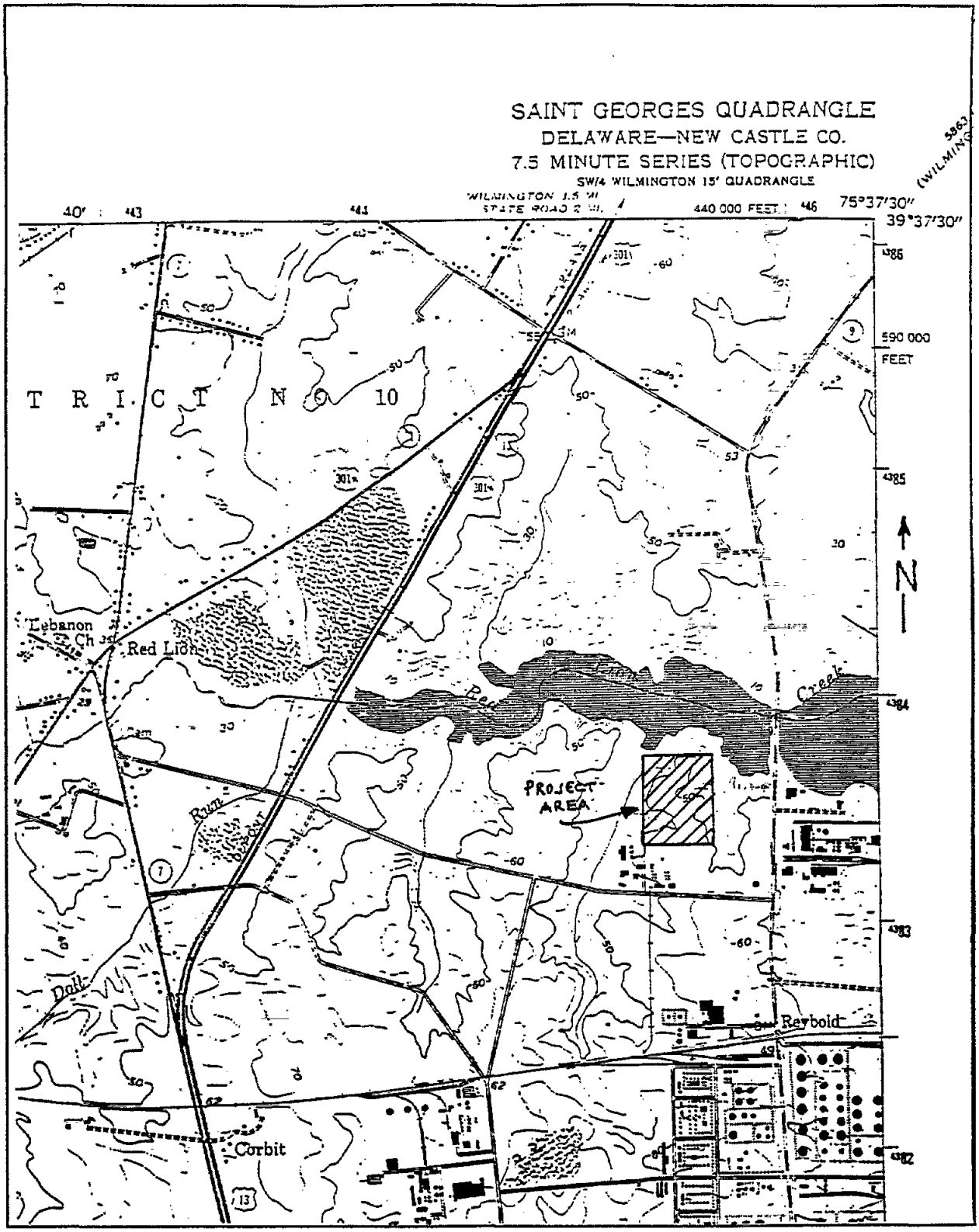


Figure 1. Location of Project Area.

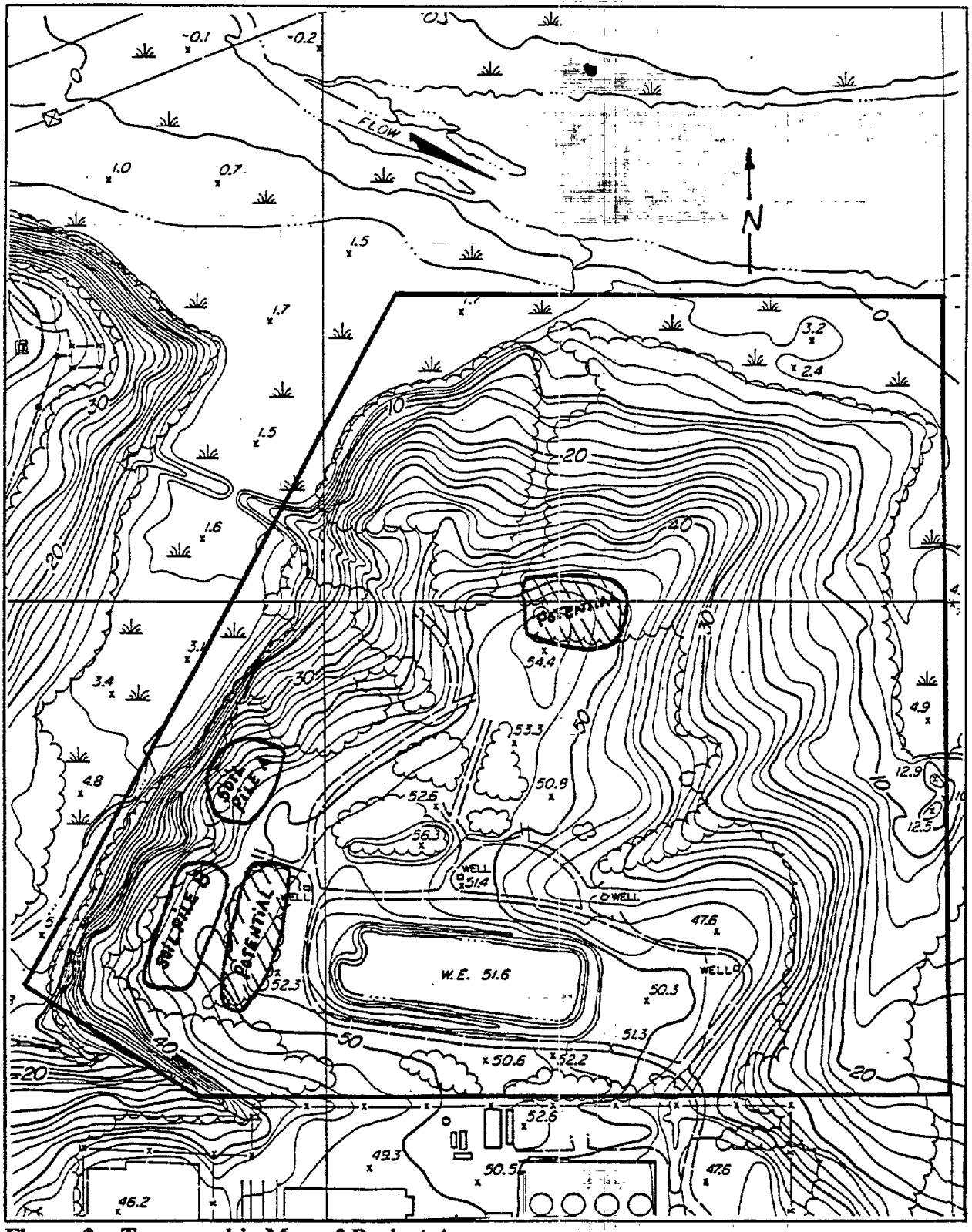


Figure 2. Topographic Map of Project Area.

5.0 Existing Sources of Information

5.1 Culture History

5.1.1 Prehistory

Paleo-Indian Period (ca. 10,000 - 6500 B.C.)

The Paleo-Indian period begins in North America with the arrival of humans from Asia across the ice-age continent of Beringia at least 15,000 years ago. The Paleo-Indian phase is not particularly well represented archaeologically in the eastern United States or in Delaware, although evidence from the region suggests that humans have lived here for at least the last 12,000 years (Custer 1984:39-60). In the west, the most widespread complex is the Llano or Clovis, typified by fluted points, scrapers, and blades. These artifacts are often found in association with extinct Pleistocene megafauna, suggesting an economy centered on big game hunting. In the east, finds showing evidence of Paleo-Indians are usually isolated fluted points, with other evidence suggesting that the Paleo-Indians here had a much more diversified subsistence strategy. On the Delmarva Peninsula, three phases of Paleo-Indian occupation are recognized by Custer: Clovis, Mid-Paleo, and Dalton-Hardaway. The starting and ending dates of the three phases have not been dated absolutely, but are defined stratigraphically and on the basis of artifact types and methods of stone tool production.

Archaic Period (ca. 6500 - 3000 B.C.)

The end of the Pleistocene saw many environmental changes, including the inundation of some riverine environments, a change from mixed coniferous forests to northern hardwoods, and the transition to a more temperate climate. The Archaic period is one of cultural adaptation to these changes. In general, the Archaic is characterized by regional specialization and the concomitant elaboration of tool kits, an increasing population, and increasing sedentism (Custer 1984:61-74).

The Archaic period is usually divided into three sub-periods: Early, Middle, and Late. Traditionally, the Early Archaic dates approximately 8000-6500 B.C., overlapping the end of the Paleo-Indian period. In Delaware, Custer includes this with the Paleo-Indian period. The Middle Archaic begins with the warming and drying trend of the Altithermal which began 6500 - 5000 B.C. and lasted for approximately 2000 years. Rainfall decreased and the rivers slowed; the sluggish waters made freshwater mussels available for the first time, encouraging riverine settlement. The Middle Archaic climate was warmer and drier than the climate today. By ca. 3000 B.C. the environment became essentially modern. What is usually termed the Late Archaic (ca. 3000 - 1000 B.C.) is much better known than the earlier phases of the period. In Delaware, Custer includes this sub-period with the Woodland period. Sedentism had increased with the increased use of aquatic resources. Ground stone tools and the atlatl were common; steatite vessels and fiber-tempered pottery were common by ca. 2000 B.C. Unfortunately, no pure Archaic components have yet been excavated in Delaware proper.

Woodland Period (ca. 3000 B.C. - A.D. 1600)

The Woodland period marks increasingly complex and varied lifeways (Custer 1984:75-171). Archaeologically-visible expressions of these changes include the widespread use of pottery, burial mounds, increased elaboration of mortuary ceremonialism, and long-distance trade. This period also witnessed the cultivation of both native and tropical plants and reliance on storage of foodstuffs. The transition from the Archaic to Woodland periods also is marked by the appearance of woodworking tools, such as axes and celts, and ceramics with fabric impressions and carved-paddle stamping. Both types of artifacts reflect a more sedentary lifeway. The bow and arrow also came into use.

In Delaware, Custer divides the Woodland period into Woodland I (traditionally, Late Archaic through Middle Woodland) and Woodland II (traditionally, Late Woodland) periods. Complexes identified for Woodland I include Clyde Farm, Barker's Landing, Wolfe Neck, Delmarva Adena, Cary, Delaware Park, and Webb. Woodland II complexes consist of the Minguannan and Slaughter Creek. The seventeenth century marks the beginning of European contact in this region.

5.1.2 Historic Period Development

The land along the Delaware River was visited by Europeans on a fairly regular basis beginning with the settlement of New Castle by Swedish colonists in 1638. Initial settlement was made at that location with the outlying area becoming settled during the rest of the century. Prior to permanent settlement, the numerous streams were explored and exploited by the colonists. The early pattern of settlement was to clear the land and build some form of temporary shelter. These impermanent buildings and structures have not survived the centuries. The oldest surviving dwelling in the area is located between Port Penn and the present Chesapeake and Delaware Canal. Known as the Ashton House it was built in 1704. A two-story brick building it represents an early attempt by the rural elite of Delaware to construct permanent dwellings. Additional early eighteenth-century dwellings are rare in the Red Lion Hundred area but this is a typical pattern in the entire state. Numbers of surviving dwellings do not remain from the seventeenth and the first six decades of the eighteenth centuries.

The last few decades of the eighteenth century and the nineteenth century saw a period of increased prosperity in Red Lion Hundred that is reflected in the surviving architecture. The area was agricultural in economic activity with only the town of St. Georges providing a rural center of population until the construction of the Chesapeake and Delaware Canal in 1828. Delaware City, at the eastern terminus of the canal, was established to serve the individuals and boat crews traveling through the canal. The canal was a non-stop passageway across the Delmarva Peninsula from the Delaware River to the Chesapeake Bay. The intent of the canal was to offer a safe, protected, and shorter route between Philadelphia and Baltimore. While the canal construction did not have an immediate effect on the architecture and history of the Red Lion Hundred area, it did reveal large quantities of Marl, a natural fertilizer. Its use transformed the agriculture of

the region and made the eastern half of Red Lion Hundred increasingly important as an agricultural center for northern Delaware.

Part of this new agricultural prosperity was brought about by the interest in peach growing for the developing urban markets along the east coast of the United States. The short-term boom in agricultural prosperity encouraged the planting of tens of thousands of peach trees and allowed the local elite to upgrade their housing stock. Much of the architecture of Delaware City and of Port Penn can be traced to rural planters moving into those population centers. While the peach boom was short lived, the farmers of the region were able to quickly shift their crops to the more traditional grains and truck farming that characterize mid-Atlantic agriculture in the nineteenth century and in the early twentieth century and thus maintain their lifestyle. One form of architecture that has not survived in the area is the tenant dwellings and the agricultural buildings that characterized the landscape for much of the period under review. The Beers' *Atlas of the State of Delaware* published in 1868 shows numerous buildings in the area but a review of current site files shows that most of those buildings have not survived to the present day. What does survive are isolated farmsteads and non-agricultural dwellings and the industrial landscape that came to the area above Delaware City in the mid-twentieth century.

5.2 Previously-Recorded Cultural Resources in Surrounding Area

5.2.1 Prehistoric Sites

Prehistoric sites on record in the files of the Delaware State Historic Preservation Office that are located within about 1 1/2 miles of the project area are listed in Table 1. None of these sites is listed on the National Register of Historic Places (NRHP) or appears to be eligible for listing. In those instances where cultural affiliations can be ascribed to sites, most appear to be mixed multicomponent Archaic and Woodland period occupations consisting of a variety of lithic tools and some ceramics.

Delaware State Archeologist Faye Stocum reported finding flakes and fire-cracked rock upslope from Soil Piles A and B (7NC-E-106) on the project site itself during a prior visit to the area.

Table 1. Prehistoric Sites Near Project Area.

Delaware Archeological Site No.	Delaware Cultural Resource Survey No.	Site Type	Cultural Affiliation/Age
7NC-E-10	N-3774	lithic surface scatter	Archaic/Woodland
7NC-E-11	N-3772	lithic surface scatter	Archaic/Woodland
7NC-E-13	N-3776	lithic surface scatter	Archaic/Woodland

7NC-E-28	N-3770	lithic scatter	prehistoric
7NC-E-29	N-3771	lithic scatter	prehistoric
7NC-E-30	N-3773	lithic scatter	prehistoric
7NC-E-33	N-3775	lithic surface scatter	Woodland
7NC-E-97	N-12,123	lithic scatter	prehistoric
7NC-E-106	N-12,808	lithic scatter	prehistoric

5.2.2 Historic Sites

Historic sites on record in the files of the Delaware State Historic Preservation Office (SHPO) that are located within about 1 1/2 miles of the project area are listed in Table 2. One of these sites is listed on the National Register of Historic Places, while the other two do not appear to be eligible for listing.

Not much specific information is available concerning these historic period sites. Site #N-5088 is plotted on the 1868 Beers' *Atlas of the State of Delaware* as "Bellevue", the estate of G.Z. Tybout. "Bellevue" is listed on the National Register of Historic Places (NRHP). Beers' *Atlas* also shows two other historic properties near the project area, although these do not have corresponding listings in the Delaware SHPO files: (1) "Willow Brook", the A.E. Davidson house, located on the western side of Route 9 just south of the project area; and (2) "Earl Farm", belonging to C.H.B. Cleaver, located west of the project area.

Table 2. Historic Sites Near Project Area.

Historic Resource	Delaware Cultural Resource Survey No.	Age	Comments
frame house	N-5053	unknown	
brick house	N-5088	19th century	"Bellevue" (Beers' *Atlas* 1868). Listed on NRHP.
stone house	N-5091	1917	

6.0 Field Work

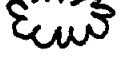
On November 5th and 6th, 1992, Dr. Christopher L. Nagle and Nathan Knoche of Dames & Moore carried out field work at the project site. On the morning of our arrival, David Bredbenner of Standard Chlorine conducted a safety lecture and orientation. Following the safety lecture, he took readings for organic vapors around the project site using a calibrated flame ionization detector. Since the readings were typical of background levels, we conducted our work in Level D protection. All field work was carried out in full compliance with Standard Chlorine's site safety rules and regulations. On November 5, the weather was light rain with a 3-4 mph wind; on November 6, it was clear with a 5-10 mph wind. We were asked not to take photographs within the project area.

6.1 Vegetation History

Nearly the entire area is vegetated, with the exception of the ground surrounding the Soil Piles accumulated during the 1986 response and cleanup, the sedimentation basin, and the gravel roads constructed and maintained to give access to groundwater monitoring wells.

Three stages of vegetation growth were identified from the reconnaissance:

1. mature forest (trees 30-50 cm in diameter) occurs along the edge of the west-facing lip of the terrace above Soil Piles A and B, again about halfway down the western slope of the project site below the Soil Piles, and on the north-facing slope of the project site, north of where the containment dike was constructed across the unnamed tributary, and facing Red Lion Creek.

2. revegetation on top of the terrace in the project site that is perhaps 10-15 years old (trees 10-15 cm in diameter). According to Paul Johnston, the plant was built in 1965 on land previously farmed. The level areas north of the plant itself may have still been farmed for several years after the plant was built. These are the limited areas of vegetation on top of the terrace north of the plant site indicated on the project site topographic map (Figure 2) as  . They are quite minor in extent.

3. revegetation postdating the 1986 spill and cleanup, consisting of young brush, saplings, honeysuckle, and brambles covering the remainder of the hilltop and adjoining monitoring well access roads. The predominance of this vegetation pattern on top of the hill suggests that much of the top of the hill was largely cleared of growth during and after the 1986 cleanup efforts. The descriptions of the 1986 cleanup construction and excavation activities in Weston's report (1988), together with their photographs of the project site in that report, are ample evidence of extensive ground

disturbance throughout the project site at that time. We found many small mounds of dirt scattered around the top of the hill, as well, which may be places where dirt and vegetation was pushed by bulldozers clearing the land and constructing monitoring well access roads during and after the 1986 cleanup efforts.

6.2 Areas of Potentially Undisturbed Soils

The humus soils found on the project site are light brown and generally less than 10 cm deep, grading into yellowish-brown sandy gravels.

The areas where the Soil Piles are located on the western slope of the project site were completely scraped and cleared of vegetation by bulldozers during the 1986 response and cleanup (Figure 2). Tree trunks and vegetation were pushed up the hill on the western slope to rest in and around the mature trees located at the western lip of the terrace. There appears to be no ground left undisturbed above (east of) Soil Pile A—the remnant of mature forest is very narrow there due to vegetation clearance and the close proximity of one of the well monitoring access roads. However, an area of approximately 100 to 200 feet by 50 feet above (east of) Soil Pile B, lying within the remnant of mature forest at the lip of the terrace, may be relatively undisturbed.

Based upon vegetation patterns, the only other place in the project site that may remain undisturbed is the far northern edge of the terrace overlooking Red Lion Creek. In this area the vegetation is transitional between type 2 identified above and the mature forest (type 1, above) on the north-facing slope. Further, it is level and relatively distant from the plant and the 1986 cleanup operations. Both this location and that above Soil Pile B are identified on Figure 2 as possibly undisturbed areas which have the potential to contain buried archeological resources within the boundaries of the project site.

6.3 Archeological Field Methods

Archeological field work consisted of a walkover and visual inspection of the entire twenty-five acre project site. Our efforts were concentrated on the level portions or on moderate slopes, where the walkover was conducted at intervals of about 10 meters. At the time of our visit, leaves had fallen, mantling the ground. In order to carry out our inspection, we used trowels and trenching shovels to clear leaf litter and, occasionally, to remove topsoil. In addition, we checked all exposed ground surfaces, intensively inspecting the columns of soil left around standing mature trees above the Soil Piles on the western lip of the terrace, since this is where Delaware State Archeologist Faye Stocum reported finding flakes and fire-cracked rock.

7.0 Inventory of Cultural Resources

Only one artifact was found, lying on the surface of the ground three meters upslope from Soil Pile A. It is a small sherd of historic pottery, 1 x 2 cm in size and 4 mm thick. The body of the

sherd is dark grey to brown in color, and one face has a lustrous black glaze. It is badly eroded on the face opposite the glazing. The sherd has been identified as redware, a refined earthenware made in England from ca. A.D. 1751—1818, with its peak production falling between A.D. 1751 and 1790 (Lynn Jones, pers. comm.). Redware possesses a fine-grained body, purplish to greyish in color, with usually a clear glaze. A variant with a glossy black glaze is called Jackfield ware. No cultural features or evidence of past structures were located in association with the potsherd.

The flakes and fire-cracked rock reported by Delaware State Archeologist Faye Stocum from along the western lip of the terrace above the Soil Piles were not relocated by us, nor were additional similar materials found during our visit.

8.0 Recommendations

The level aspect of roughly half of the project site, coupled with the proximity of Red Lion Creek, suggests that the area would have been attractive for past human occupation, both by prehistoric and historic populations. The fact that several Archaic and Woodland period prehistoric archeological sites are known from the immediate vicinity, together with evidence from the historical record of continuous occupation since the seventeenth century, serves to confirm the attractiveness of the region.

However, most of the level ground in the project area has been badly disturbed in the past. Much of the disturbance may have taken place as a result of the response and cleanup efforts by the Weston Corporation in 1986, although earlier clearing and farming of the site no doubt has played a role, as well. No cultural features or evidence of past structures were located during our survey. Only one historic period artifact was found, lying on the surface of the ground upslope from Soil Pile A.

Two small areas on the level portions of the project site were identified which may remain undisturbed: (1) a roughly rectangular area of about 100 to 200 by 50 feet at the crest of the slope above Soil Pile B, where standing mature trees suggest a lack of ground disturbance; and (2) the far northern edge of the level portion of the project area, farthest from the plant, by virtue of its distance from the plant and the loci of the 1986 cleanup operations.

Dames & Moore recommends that these two possibly undisturbed areas be avoided during future remediation efforts at the project site. If avoidance of the two areas is not feasible or is impractical, we recommend that further Phase I(B) archeological testing be conducted on them to rule out the presence of cultural resources there. The remainder of the project area does not appear to possess significant cultural resources. Therefore, it is recommended that SCD's remediation proceed without the need for further cultural resources work.

9.0 References

Beers, D.G.

1868 *Atlas of the State of Delaware*. Philadelphia: Pomeroy and Beers.

Custer, Jay F.

1984 *Delaware Prehistoric Archaeology: A Ecological Approach*. Newark: University of Delaware Press.

Scharf, J. Thomas

1888 *History of Delaware 1609-1888*, 2 volumes. Philadelphia: L.J. Richards and Co.

Weston, Roy F., Inc.

1988 *Report on Response and Cleanup Efforts of a 5 January 1986 Chlorobenzene Spill*. Report courtesy of Standard Chlorine, Inc.